THE RELATIONSHIP BETWEEN NET PREMIUM WRITTEN and POLICYHOLDERS' SURPLUS

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Nothing is so firmly believed as what we least know.

—Michel DeMontaigne

Introduction

Property-liability insurance company financial strength is important to the purchasers of the insurance product as well as to company stockholders, for this strength protects insureds against any possible company defaults. Because of this unusual buyer *caveat*, there are advantages to developing some generally applicable measures of insurance company strength. To meet this need, Roger Kenney[1] developed two of these measures approximately forty years ago. At that time insurance law did not permit multiple line companies, and consequently Kenney devised two measures, one for fire insurers and another for casualty insurers. For fire insurers the standard test was a one-to-one relationship between the unearned premium reserve and policyholders' surplus, i.e., total assets less total liabilities (this is the statutory definition of policyholders' surplus). For casualty insurers the standard test was a two-to-one relationship between net premium written and policyholders' surplus. When insurers were allowed to write both property and casualty business, the Kenney tests were maintained and applied separately after an allocation (based on premium) of surplus to distinct property and casualty "surplus accounts."

Today, the relationship of unearned premium to surplus has almost been forgotten, and the relationship between net premium written and policyholders' surplus is of prime interest, although there is no generally

[1] Kenney, R., *Fundamentals of Fire and Casualty Insurance Strength*, The Kennedy Insurance Studies, Dedham, Massachusetts, 1967, fourth ed., pg. 19ff, 97ff.

accepted standard. The June 1970 report of the National Association of Insurance Commissioners, *Measurement of Profitability and Treatment of Investment Income in Property and Liability Insurance,* discussed "The Amount of Needed Capital and Surplus." Included in the report was a quote from Mr. Thomas Morrill, President of State Farm Mutual Automobile Insurance Company.[2]

> "It is a well-established insurance management principle that premium volume should be kept within a reasonable relationship to surplus (or capital and surplus in a stock company), although there is no consensus as to what that relationship should be. The purpose of surplus is first for solvency, second for solidity. Surplus must absorb the ebb and flow of losses from both underwriting and investments. While the element of risk present in both the underwriting and investment portfolios affects the need for surplus, there is a rule of thumb which sets $2.00 of premiums written for each dollar of surplus as conservative, $3.00 or $4.00 of premium as safe, but beyond that caution should be observed."

The report concludes, " . . . the current measures of solidity relating premium to surplus are little more than rules of thumb. But until advanced computer and mathematical techniques can be applied to the 'needed' surplus question, they are the best standards we have".

More recently, (February 3, 1972) the Insurance Commissioner of New Jersey rendered a decision concerning ratemaking. That decision included an evaluation that the required capital (net worth) is one-half of the premium. In other words, a premium-net worth ratio of two-to-one is considered sound by the New Jersey Insurance Commissioner.

There have been other devlopments recently in the regulatory aspects of the insurance business. Eleven financial tests are completed on all insurance companies' Annual Statements, beginning with the 1971 statement. One of these tests, Number 7, examines the net premium written-net worth (statutory policyholders' surplus plus 20% of the unearned premium reserve) ratio. If this ratio exceeds 3.00, the company will fall into the "bad range".

It is apparent that the premium-surplus ratio is undergoing extensive revaluation. This paper explores the entire net premium written-policy-

[2] National Association of Insurance Commissioners, *Measurement of Profitability and Treatment of Investment Income in Property and Liability Insurance,* June, 1970, p. 125.

holders' surplus relationship, first by providing insight with a historical perspective followed by the short term future outlook, then ending with the significance of this relationship and conclusions. "Industry" data are for all stock companies combined.

Review of Stock Insurance Industry Premium-Surplus Ratio, 1928-1970

The net premium written-policyholders' surplus ratio is the primary method of quickly measuring insurance company strength, largely because of a lack of other useful and meaningful measures of insurers' strength. Given the large importance ascribed to this ratio, it would seem reasonable to expect a relatively stable premium to surplus relationship, perhaps showing long term trends. This is not the case. The following chart, Exhibit I, shows the premium-surplus ratio since 1929 and illustrates that there have been substantial fluctuations, both from year to year and over the long term. To understand the behavior of this series over the last forty years, it is helpful to review the individual components—net premium written and policyholders' surplus.

The net premium written of all stock companies, as depicted on Exhibit II, has shown fairly stable growth, not patently dependent on short term economic conditions but generally following long term economic growth. It is true that during the last several years the rate of growth in premium volume has increased substantially, but it is premature to predict the beginning of a new era rather than a slight statistical fluctuation. Given the stability of the premium volume and the fluctuations in the premium-surplus ratio, we are led to the conclusion that policyholders' surplus has been the volatile element.

In an effort to explain the year to year fluctuations in policyholders' surplus, we performed statistical regression analyses and conclude that the major cause of fluctuations in policyholders' surplus is changes in the stockmarket. The single series, Standard and Poor's 500 Stock year end closing average, explains 64% of the annual variation (i.e., yearly percent change) in policyholders' surplus. The following chart, Exhibit III, further illustrates how successfully this stockmarket index can be mathematically used to explain the policyholders' surplus of the insurance industry, although the residuals are not random. In this case, there is a 98% correlation between the two series. Additional statistical analysis might indicate that underwriting results or changes in leverage help explain the remaining variation in policyholders' surplus but, for our purposes, the

EXHIBIT I

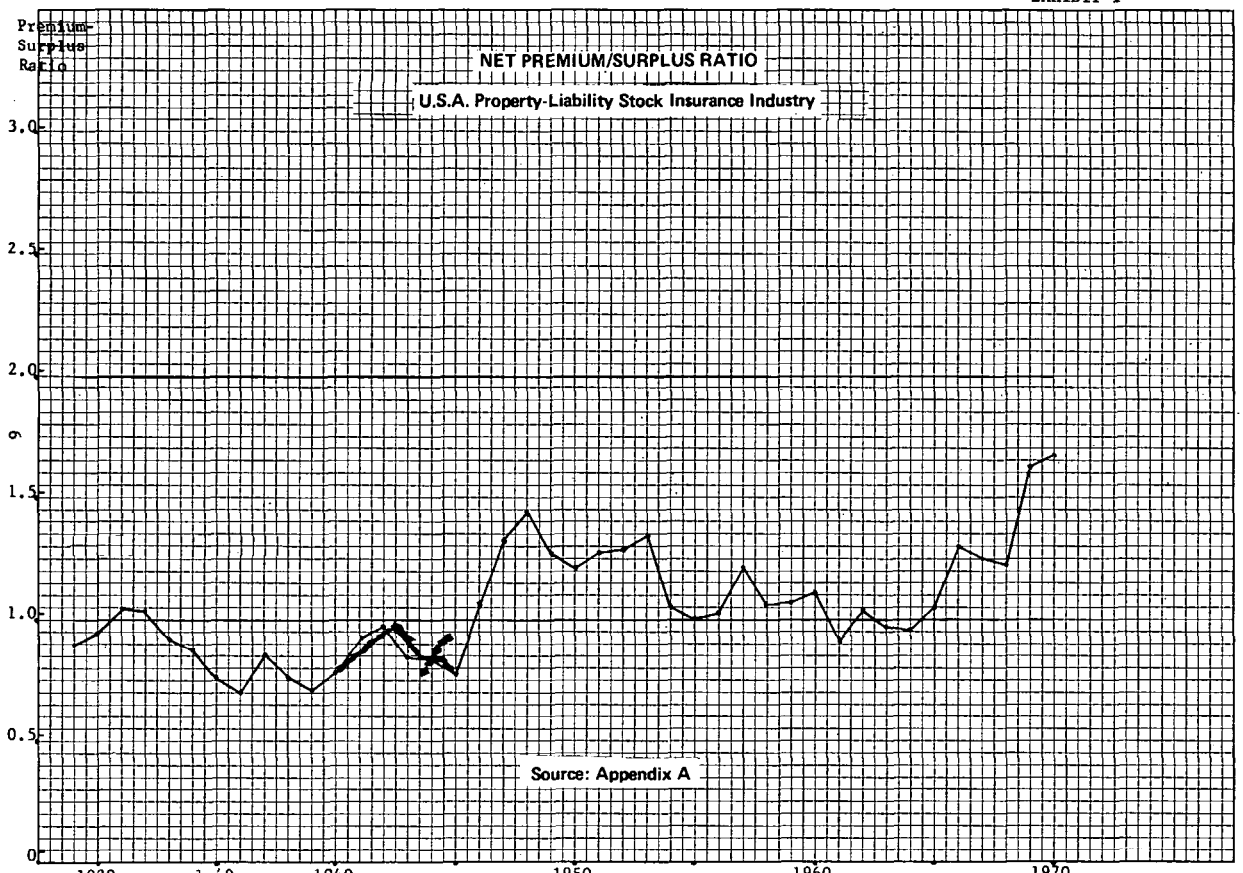

Premium-
Surplus
Ratio
NET PREMIUM/SURPLUS RATIO
U.S.A. Property-Liability Stock Insurance Industry
3.0
2.5
2.0
1.5
1.0
0.5
0
1930
1940
1950
1960
1970
Source: Appendix A

EXHIBIT II

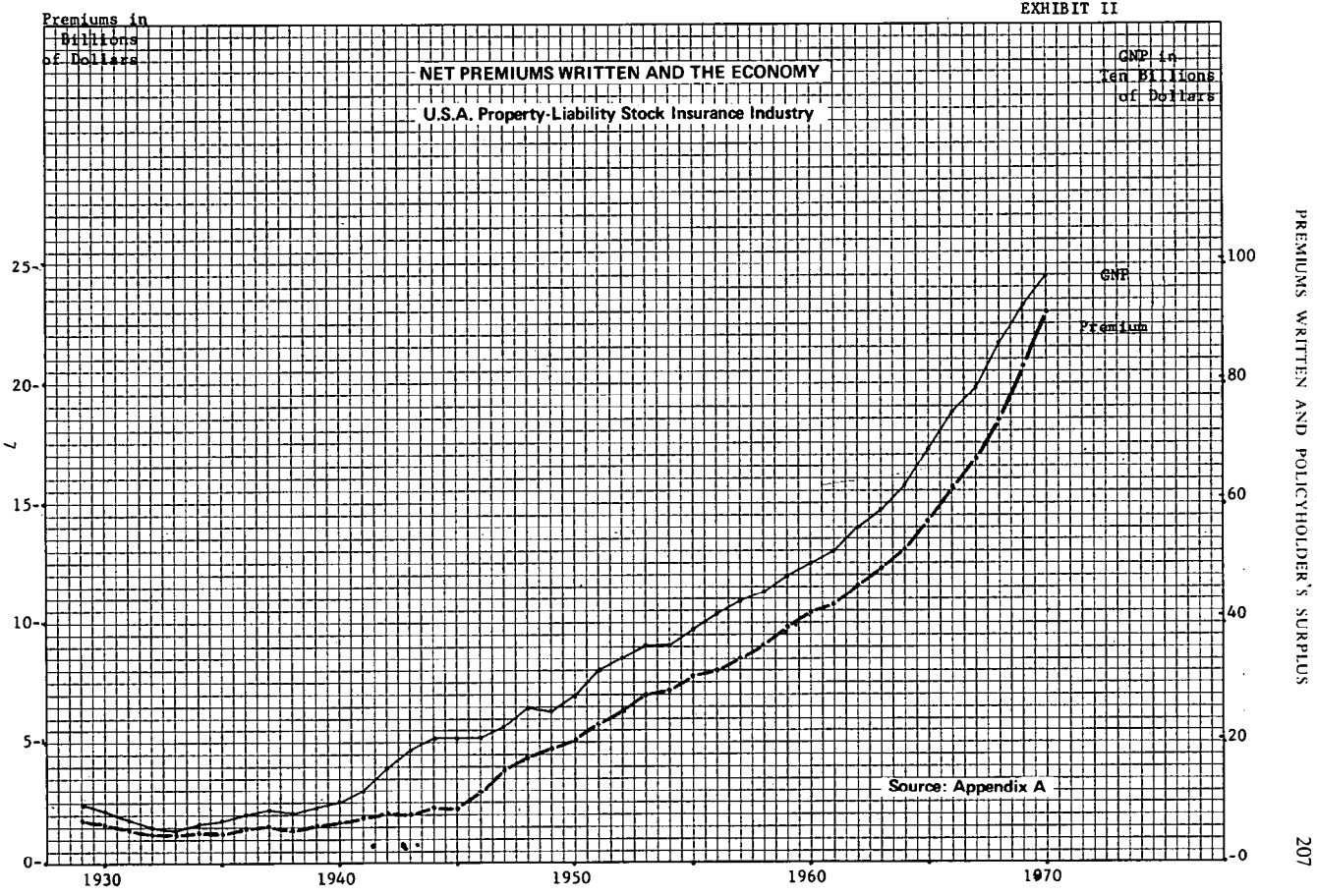
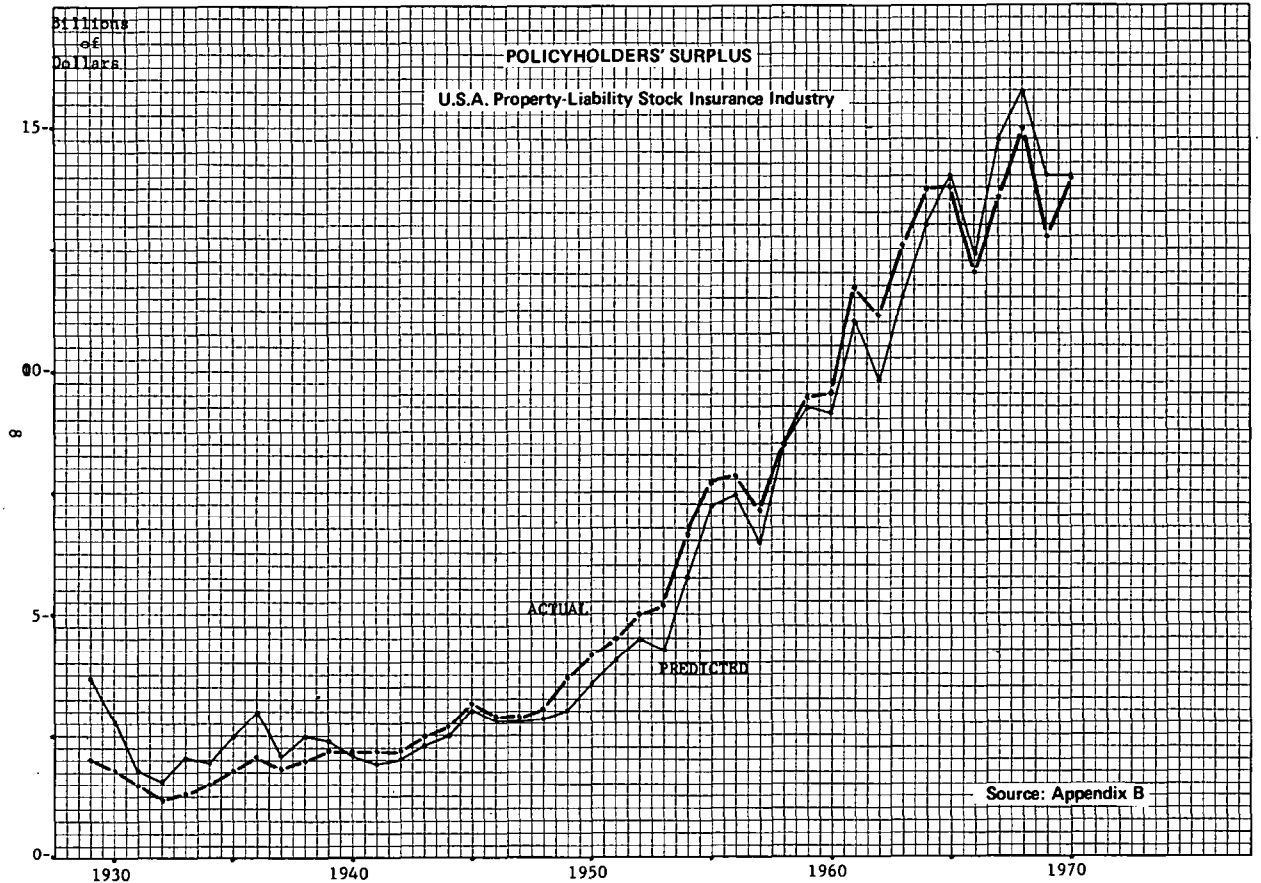

Premiums in Billions of Dollars
NET PREMIUMS WRITTEN AND THE ECONOMY
U.S.A. Property-Liability Stock Insurance Industry
GNP in Ten Billions of Dollars
25
20
15
10
5
0
100
80
60
40
20
0
GNP
Premium
Source: Appendix A
1930
1940
1950
1960
1970

EXHIBIT III


Billions of Dollars
POLICYHOLDERS' SURPLUS
U.S.A. Property-Liability Stock Insurance Industry
15
00
8
5
0
ACTUAL
PREDICTED
Source: Appendix B
1930
1940
1950
1960
1970

Standard and Poor's 500 Stock Index is adequate. The premium volume, surplus, and stockmarket index are all shown on Exhibit IV.

There are additional factors which have not been reflected but which would influence the changes in the premium-surplus ratio. They are:

(1) The statistics used are Best's Aggregates and Averages which, for policyholders' surplus, is the sum of the surplus of all companies, and not a true indication of the policyholders' surplus in the insurance industry obtained by consolidating all insurance groups; this factor tends to overstate the surplus in the insurance business. Furthermore, the disability business of some insurers has been ceded to life company affiliates in recent years, causing an inconsistency in net premium written (we have adjusted for the only transaction of this type identified in Best's[3]).

(2) The flight of "surplus surplus" from the insurance business to non-insurance parent corporations has also had a substantial impact on policyholders' surplus in recent years and tends to increase the premium-surplus ratio.

(3) Life insurance company affiliates are included in a property-liability insurance company's assets at book value whereas, in reality, the market value may be substantially greater. This method of accounting for affiliates can result in an underestimation of policyholders' surplus.

Property-Liability Insurance Industry: Premium-Surplus Expectations

In this section we predict what will happen to the premium-surplus ratio in the next five years and we explore the significance of this forecast.

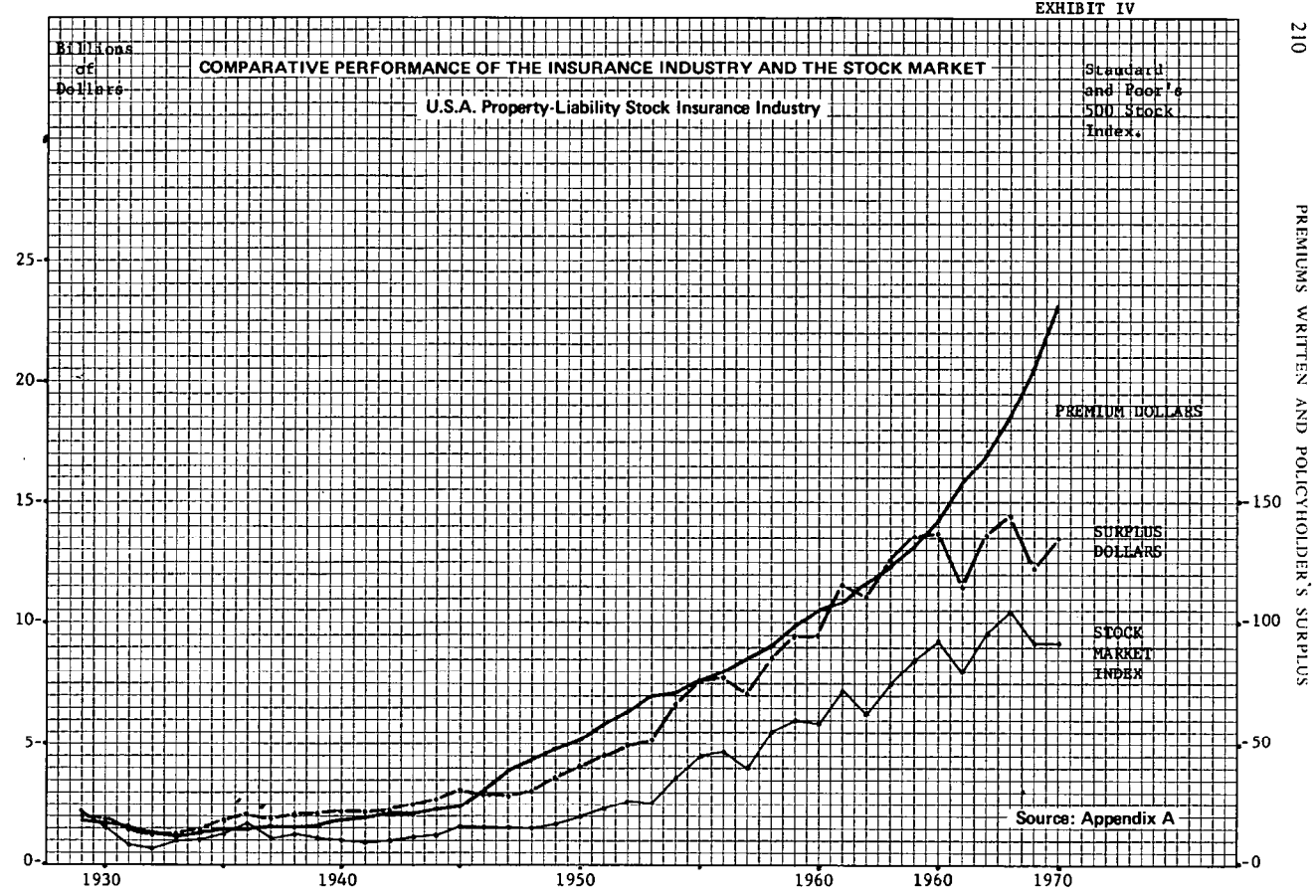
Over the last forty years, industry premium volume has increased at an average annual rate of 7%. However, during the last five years, premiums have grown at a 10% annual rate. Consequently, projecting future growth is extremely difficult.

There are several factors which determine premium growth, chief among which are:

(1) Rate Changes—Rate changes reflect changes in both frequency and severity. Although it is difficult to predict changes in frequency, we

[3]Premiums for 1963-1970 have been adjusted to include Traveler's A & H.

EXHIBIT IV



PREMIUMS WRITTEN AND POLICYHOLDER'S SURPLUS

can expect severity (average claim size) to increase because of inflation.

(2) Insurance Coverage—Inflation has a second impact on premium volume because as inflation erodes the value of the dollar, more coverage will be needed in order that property be insured to full value. Also, the use of deductibles is increasing and coverages are changing.

(3) Insurance Buying Population—Defining this class as persons age 20 and over, the insurance buying population is as follows:

Year	Population Age 20 and Over	Average Annual Increase
1964	116.4 Million	—
1970	127.3 Million	1-1/2%
1975	138.2 Million	1-3/4%
1980	150.2 Million	1-3/4%

Source: U. S. Department of Commerce (Series D projections).

From the above we conclude that growth in the insurance buying population will be greater in the next ten years than it was during the last six years.

In addition to the above factors, there are numerous other influences which cannot be quantified but are also important. These include: the adoption of no-fault auto insurance, better built and safer autos, safer working conditions, the greater proportion of low exposure service industries which reduces workmen's compensation premium volume, the higher average number of vehicles per person, greater insurance awareness of the general population, and mandatory automobile insurance coverages. The possibility of the federal government selling property-liability insurance coverages must not be overlooked, but this analysis is based on the assumption that the federal government will not intervene.

The impact of the foregoing on the stock company insurance industry net premium written is difficult to quantify, but an annual growth of 8 to 10% appears reasonable. This would indicate a 1976 premium volume of approximately $38 billion for all stock companies combined.

Projecting the 1976 policyholders' surplus in the insurance business is subject to substantial error. Assuming no significant in or out flow of capital, the major problem is to estimate the December 31, 1976, Standard and Poor's 500 Stock Index. The average annual appreciation in this stock index over the last five years, 1967 to 1971, is 5.5%; and this growth rate will be used for the next five years. Based on the relationship of annual growth in stocks to annual growth in surplus, the projected 1976 policyholders' surplus for the stock insurance industry is $18.4 billion (refer to Appendix B).

The premium-surplus ratio for the stock insurance industry might therefore be expected to increase from the 1970 level of 1.7 (the highest in the entire 40-year time period reviewed) to a new high of 2.1 in 1976. Furthermore, if the same patterns continue through 1980, the premium-surplus ratio will exceed 2.5. These simple extrapolations indicate that the entire industry will exceed the two-to-one boundary within the next decade. If the entire industry is at a 2.5 ratio, one would expect that many companies' premium-surplus ratio would be substantially higher. The significance of these higher ratios will be explored in the third section of this report.

Significance Of Premium-Surplus Ratio

In light of the volatility of the premium-surplus ratio, it is quite logical to ask why so much importance is given to the premium and surplus relationship. As mentioned earlier, this standard was devised in an attempt to measure the strength of insurance companies. Because of the publicity received, the use of this ratio has developed into a widely held "rule of thumb" for what is acceptable in the way of an operating ratio for insurance companies. The New York Insurance code that was revised in the late 1930's contained a provision that "a stock company cannot pay dividends of more than ten per cent of the capital stock unless (a) surplus to policyholders is twenty-five per cent of its unearned premium liability, or, (b) surplus above capital equals fifty per cent of the minimum capital required, whichever is greater."[4] This provision in the New York code is not particularly restrictive, limiting stockholder dividends only when the company is not sufficiently strong, and it says nothing about a desirable premium-surplus relationship. Nevertheless, the two-to-one rule is much

[4]Kenney, *Op. Cit.*, p. 98.

more widely held and discussed than any other measure of insurance company strength.

It is quite interesting that, in Mr. Kenney's "Fundamentals of Fire and Casualty Insurance Strenght," it is acknowledged that there is disagreement on the two-to-one rule and that variations from this rule are acceptable under certain circumstances.[5] However, we would go one step further and state that the application of this premium-surplus ratio is illogical for many reasons, including:

(1) The premium-surplus ratio is applied by individual company and not by group, thus causing a distortion that produces a lower ratio for the individual companies than is actually true for the group in the aggregate.

(2) The importance of the premium volume is dependent upon the geographical spread of business that the company writes, the mix of business, reinsurance arrangements, the general profit margin included in the lines of business, the long term profit record of the company, and the size of the company. Thus each company should be independently analyzed.

(3) Policyholders' surplus is a function of the total amount of paid-in capital and surplus, the rate of growth of the insurance company, the underwriting profit margin achieved, the adequacy of the loss reserves, and to a large extent, the amount of money invested in stocks and year-end level of the stock market.

(4) The rationale for using policyholders' surplus rather than stockholders' equity is ". . . the much vaunted equity is 'locked up' even when conditions become critical within a company. Which is to say that come a catastrophe or an economic upheaval, you can't release that equity without selling the birthright of a company through panicky reinsurance of the entire insurance portfolio."[6] This is a nice statement made by Mr. Kenney, but it tends to cloud the issue, being more a concern of the stockholder than of the policyholder. The premium-surplus ratio measure of strength is a tool for the policyholder and is only a measure of leverage in the eyes of the stockholder. In other words, a stockholder should prefer a higher premium-surplus ratio, while a policyholder might prefer a lower ratio.

[5] *Ibid*, p. 99.

[6] *Ibid*, p. 102.

(5) Any good measure of insurance company strength should apply to all types of companies, and the two-to-one rule is probably not applicable to mutual insurance companies and certainly not appropriate for many specialty insurers. For example, specialty insurers might be more or less risky depending on the individual company and the specialty lines written.

In summary, the premium-surplus ratio is not completely accepted, cannot be consistently applied, and, in several respects, is illogical.

In view of the questions raised on the premium-surplus relationship, it might be well to consider the objectives of this ratio. As mentioned previously, the use of the premium-surplus ratio is an attempt to measure the strength of an insurance company. Strength of a company means the ability to withstand the risks of insurance. Although generally not delineated, there are two types of risks inherent in the insurance business:

(1) Underwriting risks, which is the exposure of surplus from normal insurance underwriting operations of an insurance company, and

(2) Investment risk, which is encountered because most insurance companies invest in the stock market.

Given that there are two different types of risks for insurance companies, the logical question concerns the relative risks to the net value or worth of an insurance company by reason of underwriting operations versus investment operations. For purposes of this analysis we have defined net worth simply as capital and surplus plus the equity in the unearned premium reserve (assumed to be 20%). During any calendar year the underwriting risk to net worth is equal to the underwriting profit or loss during the year plus the amount of investment income derived from policyholder-supplied funds. (It is not unreasonable to assume that policyholder-supplied funds produce approximately one-half of net investment income, excluding capital gains.) The investment risk during the calendar year is represented by realized and unrealized capital gains plus the remaining one-half of net investment income. Federal income taxes have been ignored.

The following table sets forth, for the period 1940-1970, the impact on net worth from underwriting risk and investment risk (as defined above) in each calendar year. The source of the unadjusted data is Best's Aggregates and Averages.

U.S.A. Property-Liability Stock Insurance Industry
(millions of dollars)

Year	Net Worth At Jan. 1*	Insurance Profit or Loss+	Investment Profit or Loss	Increase or Decrease In Net Worth From: Insurance	Investment
1971	$16,262	NA	NA	NA	NA
1970	14,785	$566	$ 530	3.83%	3.58%
1969	16,805	223	−1,111	1.33	−6.61
1968	15,380	349	1,729	2.27	11.30
1967	13,711	503	1,809	3.67	13.19
1966	15,265	551	−1,000	3.61	−6.55
1965	15,206	1	1,040	0.0	6.84
1964	14,009	43	1,430	0.31	10.20
1963	12,558	141	1,657	1.12	13.20
1962	13,068	339	−566	2.59	−4.33
1961	10,829	340	2,206	3.14	20.37
1960	10,670	362	359	3.39	3.37
1959	9,820	338	754	3.44	7.68
1958	8,227	151	1,830	1.84	22.24
1957	8,891	−131	−396	−1.47	−4.46
1956	8,740	79	365	0.90	4.18
1955	7,687	452	950	5.88	12.36
1954	6,143	566	1,402	9.21	22.83
1953	5,849	496	104	8.48	1.78
1952	5,344	332	402	6.21	7.52
1951	4,465	149	409	3.34	9.16
1950	3,934	317	474	8.06	12.05
1949	3,270	528	421	16.15	12.88
1948	3,077	294	58	9.56	1.89
1947	3,019	17	43	0.57	1.42
1946	3,285	−75	−89	−2.28	−2.71
1945	2,829	106	441	3.75	15.59
1944	2,584	142	261	5.50	10.11
1943	2,312	219	266	9.47	11.51
1942	2,248	135	23	6.01	1.03
1941	2,284	119	−25	5.21	−1.01
1940	2,250	131	−3	—	—
			MEAN:	4.17	7.02
			STANDARD DEVIATION:	3.87	8.10
			VARIANCE:	15.00	65.69

*Capital and surplus plus equity (20%) in unearned premium reserve

+Underwriting profit or loss plus 50% of investment profit or loss

The foregoing table clearly demonstrates that risk (i.e., the variation in rate of return) from insurance operations is minimal when compared to the risk resulting from stock market fluctuations.

The underwriting risk cannot be avoided as long as a company continues doing insurance business, although the risk is minimized by reinsurance, diversification, and the stabilizing aspects of large size. On the other hand, given the current practice of carrying bonds at amortized values, the investment risk could be minimized by eliminating investments in the stock market and investing all assets in bonds. Such an investment policy would have additional advantages:

(1) Net investment income and net operating income, the reported earnings of the company, would increase.

(2) Fluctuations in policyholders' surplus and the resulting fluctuations in the premium-surplus ratio would be minimized.

(3) It would avoid any possible problem of the accounting for marketable securities, currently being investigated by accountants. However, if the evaluation of bonds is changed to market value, the stabilizing aspect of bond investments would be at least partially lost.

The long term impact on policyholders' surplus should undergo further investigation. Although net operating income, and consequently increases in policyholders' surplus, would be greater if all investments were in bonds, it is true that the past growth in surplus resulted largely from the appreciation of stock market investments. The significance of this point, however, is contingent upon an evaluation of the long term prospects of investments in the stock market and should not hinge solely on the historical appreciation realized by stock investments.

In summary, the fluctuations of the net worth of insurance companies arise primarily from investment operations, particularly capital gains and losses. On the other hand, the substantial growth of policyholders' surplus and net worth over the last forty years can, to a large extent, be attributed to investment appreciation.

CONCLUSIONS

The foregoing historical analysis and projections lead to several basic conclusions:

(1) The stock market is the major factor affecting policyholders' surplus and the premium-surplus ratio.

(2) The premium-surplus ratio measures the leverage of an insurance company and consequently the stockholders should prefer a higher ratio. From the policyholder's viewpoint, this ratio is an indication of the strength of the insurer, and thus a lower ratio indicates a more heavily capitalized and "stronger" insurer.

(3) The net premium written-policyholders' surplus ratio, as shown previously, is distorted because policyholders' surplus has been overstated. The following table shows industry data, as presented on Exhibit I, and includes a premium-surplus ratio based on consolidated insurance industry surplus[7] (consolidated data are not available for earlier years):

Net Premium Written-Policyholder's Surplus Ratio

	Stock Insurance Industry	
Year	Aggregate	Consolidated
1970	1.66	2.20
1969	1.63	1.87
1968	1.24	1.41
1967	1.25	1.42
1966	1.31	1.50
1965	1.05	1.23
1964	.96	1.13
1963	.97	1.16
1962	1.04	1.22
1961	.92	1.10
1960	1.11	1.31
Average	1.19	1.41

The above presentation indicates that the actual premium-surplus ratio (reflecting consolidated policyholders' surplus after eliminating the double counting of surplus of subsidiary insurance companies) is approximately 20% higher than the previous analysis would indicate.

[7]Annual Statements are consolidated with interownership eliminated through holdings shown in Schedules D1 and D2. *Report of the Advisory Committee on Use of Investment Income in Making Rates for Automobile Insurance to the State Board of Insurance of Texas*, October 19 and 20, 1970, p. 87.

(4) Carrying bonds at amortized values is a major factor for property-liability insurance companies. This practice eliminates short and medium term swings in surplus and contributes stability to the policyholders' surplus account. Any proposal to change this method of accounting should be closely scrutinized to eliminate undesired consequences. Conversely, the practice of carrying all stock investments at market value contributes substantially to short and medium term swings in surplus and contributes instability to the policyholders' surplus account. The discussions on accounting for marketable securities should be closely followed for both stock and bond investments.

This paper was not intended to be the final commentary on the net premium written-policyholders' surplus ratio, but rather a review of the subject. Hopefully this paper will stimulate actuarial research in other financial areas which heretofore have been largely overlooked.

APPENDIX A—STOCK INSURANCE INDUSTRY DATA

Year	Standard & Poor's	% Change	GNP	% Change	Surplus	% Change	Premium	% Change	P/S Ratio
1929	21.45	−11.9	1044	6.31	2037	11.8	1826	5.31	.896
1930	15.34	−28.5	911	−12.74	1824	−10.5	1700	− 6.90	.932
1931	8.12	−47.1	763	−16.25	1466	−19.6	1532	− 9.88	1.045
1932	6.89	−15.1	585	−23.33	1243	−15.2	1288	−15.93	1.036
1933	10.10	46.6	560	− 4.27	1288	3.6	1182	− 8.23	.918
1934	9.50	− 5.9	650	16.07	1472	14.3	1282	8.46	.871
1935	13.43	41.4	725	11.54	1784	21.2	1332	3.90	.747
1936	17.18	27.9	827	14.07	2079	16.5	1445	8.48	.695
1937	10.55	−38.6	908	9.79	1828	−12.1	1579	9.27	.864
1938	13.21	25.2	852	− 6.17	1972	7.9	1508	− 4.50	.765
1939	12.49	− 5.5	911	6.92	2179	10.5	1571	4.18	.721
1940	10.58	−15.3	1006	10.43	2209	1.4	1730	10.12	.783
1941	8.69	−17.9	1258	25.05	2164	− 2.0	1989	14.97	.919
1942	9.77	12.4	1591	26.47	2222	2.7	2165	8.85	.974
1943	11.67	19.4	1925	20.99	2494	12.2	2091	− 3.42	.838
1944	13.28	13.8	2114	9.82	2729	9.4	2258	7.99	.827
1945	17.36	30.7	2136	1.04	3151	15.5	2425	7.40	.770
1946	15.30	−11.9	2107	− 1.36	2879	− 8.6	3063	26.31	1.064
1947	15.30	0.0	2343	11.20	2905	0.9	3862	26.09	1.329
1948	15.20	− 0.7	2594	10.71	3066	5.5	4403	14.01	1.436
1949	16.76	10.3	2581	− 0.50	3708	20.9	4760	8.11	1.284
1950	20.41	21.8	2848	10.34	4217	13.7	5138	7.94	1.218
1951	23.77	16.5	3284	15.31	4543	7.7	5759	12.09	1.268
1952	26.57	11.8	3455	5.21	4964	9.3	6411	11.32	1.291
1953	24.81	− 6.6	3646	5.53	5192	4.6	7000	9.19	1.348
1954	35.98	45.0	3648	0.05	6697	29.0	7144	2.06	1.067
1955	45.48	26.4	3980	9.10	7694	14.9	7662	7.25	.996
1956	46.67	2.6	4192	5.33	7800	1.4	7991	4.29	1.024
1957	39.99	−14.3	4411	5.22	7073	− 9.3	8640	8.12	1.222
1958	55.21	38.1	4473	1.41	8619	21.9	9077	5.06	1.053
1959	59.89	8.5	4837	8.14	9381	8.8	9931	9.41	1.059
1960	58.11	− 3.0	5037	4.13	9495	1.2	10527	6.00	1.109
1961	71.55	23.1	5201	3.26	11719	23.4	10783	2.43	.920
1962	63.10	−11.8	5603	7.73	11146	− 4.9	11599	7.57	1.041
1963	75.02	18.9	5905	5.39	12642	13.4	12296	6.01	.973
1964	84.75	13.0	6324	7.10	13691	8.3	13090	6.46	.956
1965	92.43	9.1	6849	8.30	13660	− 0.2	14339	9.54	1.050
1966	80.33	−13.1	7499	9.49	12007	−12.1	15728	9.69	1.310
1967	96.47	20.1	7939	5.87	13580	13.1	16915	7.55	1.246
1968	103.86	7.7	8650	8.96	14887	9.6	18457	9.12	1.240
1969	92.06	−11.4	9314	7.68	12669	−14.9	20668	11.98	1.631
1970	92.15	0.1	9765	4.84	14014	10.6	23215	12.32	1.657

Notes:
1. Standard & Poor's 500 Stock Index at December 31.
2. Premium and Surplus from A. M. Best's Aggregates & Averages.
3. Premiums for 1963-1970 have been adjusted to include Travelers' A & H.
4. Percentage change from previous year.
5. Premiums and Surplus given in millions of dollars.

APPENDIX B
STOCK INSURANCE INDUSTRY
POLICYHOLDERS' SURPLUS
(MILLIONS OF DOLLARS)

Year	Actual	Predicted	Error
1929	$ 2037	$ 3714	$−1677
1930	1824	2822	− 998
1931	1466	1768	− 302
1932	1243	1588	− 345
1933	1288	2057	− 769
1934	1472	1969	− 497
1935	1784	2543	− 759
1936	2079	3091	−1012
1937	1828	2123	− 295
1938	1972	2511	− 539
1939	2179	2406	− 227
1940	2209	2127	81
1941	2164	1851	312
1942	2222	2009	212
1943	2494	2286	207
1944	2729	2521	207
1945	3151	2117	33
1946	2879	2816	62
1947	2905	2816	88
1948	3066	2802	263
1949	3708	3030	677
1950	4217	3563	653
1951	4543	4053	489
1952	4964	4462	501
1953	5192	4205	986
1954	6697	5836	860
1955	7694	7224	469
1956	7800	7397	402
1957	7073	6422	650
1958	8619	8644	− 25
1959	9381	9328	52
1960	9495	9068	426
1961	11719	11031	687
1962	11146	9797	1348
1963	12642	11537	1104
1964	13691	12958	732
1965	13660	14080	− 420
1966	12007	12313	− 306
1967	13580	14670	−1090
1968	14887	15749	− 862
1969	12669	14026	−1357
1970	14014	14039	− 25

Note: The above predictions are based on the equation:
Surplus $ = (Stock Index) ($146) + $582.6

For example, the Standard and Poor's 500 Stock Index was 92.15 on December 31, 1970. Therefore the predicted Surplus (in millions) is 92.15 times $146 plus $582.6, or $14,039 million.